

## ABSTRACT OF THE DISCLOSURE

A method of inducing spin excitation by employing RF transmission fields of time-varying spatial characteristics in order to better control the overall distribution of spin excitation. The MRI transmit inductor system generates an RF transmission of particular spatial characteristics, followed by one or more additional RF transmissions with different spatial characteristics, where the additional RF transmissions alter the spin excitation produced by the first RF transmission. The spin excitation can be provided by a sequence of two or more discrete RF transmissions with different spatial characteristics, by a single RF transmission that has continuously varying spatial characteristics, by using successive RF transmissions of the primary and higher order modes of a volume coil, and/or by an RF transmission from a volume or surface coil followed by a second RF transmission from one or more local surface coils.